

# Family Support Materials

## Linear Equations, Inequalities, and Systems

In this unit, your student will analyze constraints on different quantities. For example, the amount you spend on a bicycle may be limited by how much you have saved. To qualify for a sports team, you may need to practice at least a certain number of hours, or lift at least a certain number of pounds.

Here are some ways to write constraints using mathematical notation:

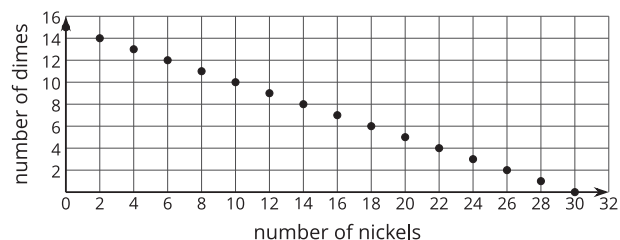
$w < 20$ . An apartment building only allows dogs that weigh less than 20 pounds.

$m + g + b = 4$ . A casserole recipe calls for four cups of vegetables. You have mushrooms, green beans, and broccoli.

$12.5c + 15a \geq 1,000$ . In order for a concert to be performed, the artists need to be sure of \$1,000 in ticket sales. Tickets for children under 18 are \$12.50, and tickets for adults are \$15.

$5n + 10d = 150$ . You need \$1.50 in coins for a parking meter. You have a bunch of nickels and dimes in your pocket.

For this last situation, we can see that using more dimes to make \$1.50 means that we can use fewer nickels, and vice-versa. A graph allows us to see this relationship even more clearly.



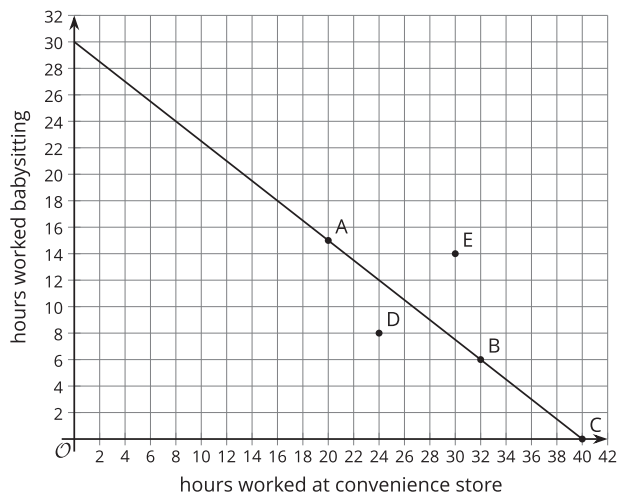
Each point on the graph represents a combination of nickels and dimes that totals \$1.50. For example, if you use 8 nickels, you will need 11 dimes.

Here is a task for you to try with your student:

Priya is saving money to go on an overnight school trip. The cost of the trip is \$360. She has a job at a convenience store, which pays \$9 per hour, and sometimes babysits for a family in her neighborhood, which pays \$12 per hour.

The equation  $9x + 12y = 360$  represents all the combinations of hours Priya could work at each job and earn a total of \$360. Here is a graph showing those combinations:

1. What are the coordinates of point *A*?
2. What does it tell us about the number of hours Priya worked at each job?
3. Answer the same questions about points *B* and *C*.
4. Point *D* is not on the line. How should we interpret point *D*?
5. Point *E* is not on the line. How should we interpret point *E*?



**Solution:**

1. (20, 15)
2. Priya works 20 hours at the convenience store and 15 hours babysitting.
3. Point *B*: (32, 6). Priya works 32 hours at the convenience store and 6 hours babysitting. Point *C*: (40, 0). Priya works 40 hours at the convenience store and does not babysit at all.
4. Priya does not make enough money. She works 24 hours at the convenience store and 8 hours babysitting. She makes only \$312, since  $24 \cdot 9 + 8 \cdot 12 = 312$ .
5. Priya makes more than enough money: \$438. She works 30 hours at the convenience store and 14 hours babysitting.  $30 \cdot 9 + 14 \cdot 12 = 438$ .

## Video Lesson Summaries

Here are the video lesson summaries for Algebra 1, Unit 2: Linear Equations, Inequalities, and Systems. Each video highlights key concepts and vocabulary that students learn across one or more lessons in the unit. The content of these video lesson summaries is based on the written Lesson Summaries found at the end of lessons in the curriculum. The goal of these videos is to support students in reviewing and checking their understanding of important concepts and vocabulary. Here are some possible ways families can use these videos:

- Keep informed on concepts and vocabulary students are learning about in class.
- Watch with their student and pause at key points to predict what comes next or think up other examples of vocabulary terms (the bolded words).
- Consider following the Connecting to Other Units links to review the math concepts that led up to this unit or to preview where the concepts in this unit lead to in future units.

Algebra 1, Unit 2: Linear Equations, Inequalities, and Systems	Vimeo	YouTube
Video 1: Building a Model (Lessons 1–3)	<a href="#">Link</a>	<a href="#">Link</a>
Video 2: Solutions to Linear Equations (Lessons 4–6)	<a href="#">Link</a>	<a href="#">Link</a>
Video 3: Rewriting Equations (Lessons 7–9)	<a href="#">Link</a>	<a href="#">Link</a>
Video 4: Equations and Their Graphs (Lessons 10–12)	<a href="#">Link</a>	<a href="#">Link</a>
Video 5: Solving Systems of Equations (Lessons 13–17)	<a href="#">Link</a>	<a href="#">Link</a>
Video 6: One-Variable Inequalities (Lessons 18–20)	<a href="#">Link</a>	<a href="#">Link</a>
Video 7: Systems of Inequalities (Lessons 21–25)	<a href="#">Link</a>	<a href="#">Link</a>

### Video 1

Video 'VLS Alg1U2V1 Building a Model (Lessons 1–3)' available here:  
<https://player.vimeo.com/video/448619590>.

### **Video 2**

Video 'VLS Alg1U2V2 Solutions to Linear Equations (Lessons 4–6)' available here:  
<https://player.vimeo.com/video/449365025>.

### **Video 3**

Video 'VLS Alg1U2V3 Rewriting Equations (Lessons 7–9)' available here:  
<https://player.vimeo.com/video/455571987>.

### **Video 4**

Video 'VLS Alg1U2V4 Equations and Their Graphs (Lessons 10–12)' available here:  
<https://player.vimeo.com/video/455574695>.

### **Video 5**

Video 'VLS Alg1U2V5 Solving Systems of Equations (Lessons 13–17)' available here:  
<https://player.vimeo.com/video/458390393>.

### **Video 6**

Video 'VLS Alg1U2V6 One-Variable Inequalities (Lessons 18–20)' available here:  
<https://player.vimeo.com/video/458008350>.

### **Video 7**

Video 'VLS Alg1U2V7 Systems of Inequalities (Lessons 21–25)' available here:  
<https://player.vimeo.com/video/458405302>.